

MU GROUP CONSULTING

TECHNICAL NOTE

**State Significant Development at 884-928
Mamre Road, Kemps Creek**

Issue: August 2022

Ref: P21_19_APP_Mamre_WAD_DD



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This technical note has been prepared by MU Group to document design decisions made during the development of the strategic design and record comments in response to the technical queries raised by Project Strategy in their email dated 9 August 2022, Altis Property Partners in their email dated 10 August 2022 and TfNSW. The technical note covers:

- Project Background
- Response to TfNSW comments
- Additional Comments
- Appendix A: Strategic Design - LILO with acceleration lane – TfNSW Ultimate Layout
- Appendix B: Strategic Design – Swept Path of PBS Level 3 Type A Vehicle
- Appendix C: Strategic Design – LILO restricting right turns at Mamre Road
- Appendix D: Strategic Design – Proposed travel path for local resident vehicles

Project Background

Altis Property Partners is developing the site at 884-928 Mamre Road. Kemps creek for warehousing and corporate office accommodation that contains a land size of approximately 202,000m². The Proposed development is classified as State Significant Development (SSD). The proposed development aims to provide Left in Left Out (LILO) access off Mamre Road to cater for B-Double movements. TfNSW plans to upgrade Mamre Road to a four-lane carriageway sometime in the future. This would need to be considered in developing the design for the new LILO access off Mamre Road.

Altis Property Partners submitted the strategic design developed by MU Group of the LILO access arrangement which included deceleration lane and acceleration lane to TfNSW for assessment and approval (Refer to Drawing No. 2021_19_SK_0007 in **Appendix A**). TfNSW provided comments, as stated in Altis's email dated 10 August 2022: "*acceleration lane is not supported at the proposed location for the following reasons:*

- *Due to site constraints (impacts to adjoining landowners).*
- *The design provided is unorthodox and there is nothing that requires a resident to use that arrangement. The cut-out in the median may also be mistaken as a refuge.*
- *The length of the acceleration lane at this location is considered too short and would not be supported on this ground."*

TfNSW recommended that:

- *A give-way treatment is provided with a deceleration in line with the Austroads Standards.*
- *LILO is to be designed to physically restrict right turn movements at Mamre Road.*
- *Pedestrian/cyclist are to be considered in the design.*
- *Swept paths of the longest vehicles simultaneous entry/exit in line with Austroads Std.*
- *Design showing location of LILO with the ultimate Mamre Road upgrade alignment.*

Main objective of this technical note is to respond to the comments provided by TfNSW.

TfNSW Comments:

1. TfNSW does not support the acceleration lane at proposed location due to site constraints (impacts to adjoining landowners).

MU Group notes the weaving issue at the proposed acceleration lane with vehicles entering two private property driveways and with heavy vehicles exiting the development site. It is noted that the weaving manoeuvres may conflict and create safety issues resulting in a crash.

The strategic design submitted to TfNSW addresses the weaving movement by including a sign that allows local traffic to use the deceleration lane and enter a gap in the splitter median to safely enter the acceleration lane prior to entering the driveway.

2. The design provided is unorthodox and there is nothing that requires a resident to use that arrangement. The cut-out in the median may also be mistaken as a refuge.

The Design (Drawing No. 2021_19_SK_0007) has now been amended to remove cut-out in the median. An alternative arrangement to avoid the weaving movement is to allow the local traffic to enter the development site and use the internal roundabout (approximately 200m within the development) for a U-turn movement and exit via the acceleration lane to access their properties. Refer to attached **Appendix D**. This can be developed into a Local Access Plan for the private properties. It is noted that the volume of local traffic performing this manoeuvre is anticipated to be 2-4 vehicles per day.

3. The length of the acceleration lane at this location is considered too short and would not be supported on this ground.

The length of acceleration lane in the strategic design is **320m, which complies with Table 5.7 of Austroads Guide to Road Design Part (AGRD) 4A**. This is based on the acceleration lane length for semi-trailers to a specified decrement of 20km/h below the through lane speed of 80km/h.

Downgrade (%)	Truck speed (km/h)				
	100	90	80	70	60
0	2400	1500	910	550	320
1	1400	940	640	410	250
2	970	700	500	330	210
3	760	560	400	280	180

Note: For the purpose of calculating acceleration lane lengths at intersections, the through road speed is usually made equal to the mean free speed (which is often approximately equal to the speed limit).

Source: Based on Austroads (2002).

Note: Austroads does not specify acceleration lane lengths for vehicles greater than semi-trailers i.e., B-Doubles

This approach is supported by AGRD 4A (section 5.4) which states:

The speed of heavy vehicles needs to be considered when designing acceleration lanes. For the design of new acceleration lanes, it is preferable that the design heavy vehicle has sufficient length to accelerate

to a speed **no less than 20km/h below the mean free speed** of the through road, particularly if the acceleration lane is on a dedicated heavy vehicle route.

As trucks require very long acceleration distances, often to an extent that is not possible to accommodate on practice, a speed differential between general traffic and heavy vehicles will usually have to be accepted at the point of merging.

If the “mean free speed” of 80km/hr is used to calculate the acceleration lane length then the result is **910m**, which conflicts with Abbots Road intersection that is approximately **837m** from the proposed LILO intersection. Hence, this approach is deemed not practical.

Table 5.7: Acceleration lane lengths (m) for semi-trailers to accelerate from rest to a specified speed on a level or downgrade

Downgrade (%)	Truck speed (km/h)				
	100	90	80	70	60
0	2400	1500	910	550	320
1	1400	940	640	410	250
2	970	700	500	330	210
3	760	560	400	280	180

Note: For the purpose of calculating acceleration lane lengths at intersections, the through road speed is usually made equal to the mean free speed (which is often approximately equal to the speed limit).

Source: Based on Austroads (2002).

In addition, Austroads (AGRD-Part 3) states:

*Where possible, overtaking lanes should be located so that **merge tapers are not located on curves**. Where this is not possible, care should be exercised with the location design of all merging tapers to ensure that there is adequate sight distance for the approaching driver to comprehend the existence of the merge and its geometry.*

The termination of the auxiliary lane should be at a point where there is a sufficient sight distance of the overtaking driver to decide whether to complete or abandon the overtaking manoeuvre. It is important that the termination point provides sufficient sight distance to allow a smooth and safe merge between fast and slow vehicle streams.

It is desirable for the termination point to be on a straight to give drivers a better visual appreciation of the approaching merge.

Based on MU Group design experience, it is a good design practice within TfNSW to consider ending the merge taper on a straight section of road to provide the best definition of the merge and should be achieved wherever possible. Ending within a horizontal curve may still meet sight distance requirements but may not provide the same definition of where the lane is terminating.

The MU Group’s strategic design that includes an acceleration lane has been developed in accordance with Austroads Guide to Road Design Part 3 and 4A and complies with Austroads and TfNSW standards and requirements.

4. A give-way treatment is provided with a deceleration in line with the Austroads Standards.

A revised strategic design can be developed with a Give Way treatment at the Left-Out exit without an acceleration lane if this is the agreed approach.

5. LILO is to be designed to physically restrict right turn movements at Mamre Road

The raised concrete median on the design has been extended to physically restrict or make it difficult for a vehicle to perform a right turn movement at Mamre Road. This is supported by the installation of a regulatory sign R2-6(R) No Right Turn (Refer to **Appendix C**).

6. Pedestrian/cyclist are to be considered in the design.

Pedestrians and cyclists have been considered in the design with a dedicated bicycle lane on Mamre Road and connecting shared path to cater for both pedestrians and cyclists.

7. Swept paths of the longest vehicles simultaneous entry/exit in line with Austroads Std.

36.5m PBS Level 3 Type A vehicle has been adopted as the check vehicle to assess the swept path for simultaneous entry / exit. Swept path analysis is as shown on the plan attached in **Appendix B**.

8. Design showing location of LILO with the ultimate Mamre Road upgrade alignment

The strategic design has been overlaid on the TfNSW Mamre Road "Ultimate" design. Refer to Drawing No. 2021_19_SK_0007. The plans show that the LILO is constructed outside the ultimate Mamre Road design footprint and includes a shared path that can tie up with the ultimate design following the merger.

Additional Comments:

9. Is there is a crest or ridge within the extent of the current acceleration lane, both existing and in the future Mamre Rd design.

The current topography of Mamre Road based on conducted survey appears to show that there is an average down gradient of <1%. In an area within the extent of the proposed acceleration lane there is a slight crest with a gradient of 0.836% which will not impact on the acceleration lane length and design.

The final levels within TfNSW future Mamre Road Ultimate design will be considered and adopted in the subsequent design phases.

10. The current topography and the geometry are suitable relative to the design. The geometry is consistent with TfNSW design parameters and guidelines

The MU Group strategic design was developed based on the site investigations and available survey information at the time along with TfNSW Mamre Road "Ultimate" design received from Altis in May 2021. Furthermore, the design was developed in accordance with Austroads and TfNSW requirement in relation to length of deceleration and acceleration lanes and compliance with current and future topography, geometry, speed environment of Mamre Road and TfNSW design for Mamre Road upgrade.

It is considered that the current topography and the geometry is suitable relative to the design and is consistent with TfNSW design parameters. The design can be further refined and optimised in the subsequent concept and detailed design phases.

11. Overall design works and is in accordance with TfNSW standards and requirements

It has been described in previous responses to comments that the MU Group Strategic Design complies with Austroads Guide to Road Design and TfNSW standards and requirements.

With regards to the presence of an acceleration lane in the proposed design, it should be noted that as per Austroads (AGRD - 4A) requirements where traffic volumes on the road and the number of trucks entering are relatively high, it is preferable to provide an acceleration lane to establish the presence of entering truck on the major road, even though a higher than desirable speed differential between trucks and cars may occur near the merge area.

In addition, it is noted that TfNSW publication "*Guide to Traffic Generating Developments*" states:

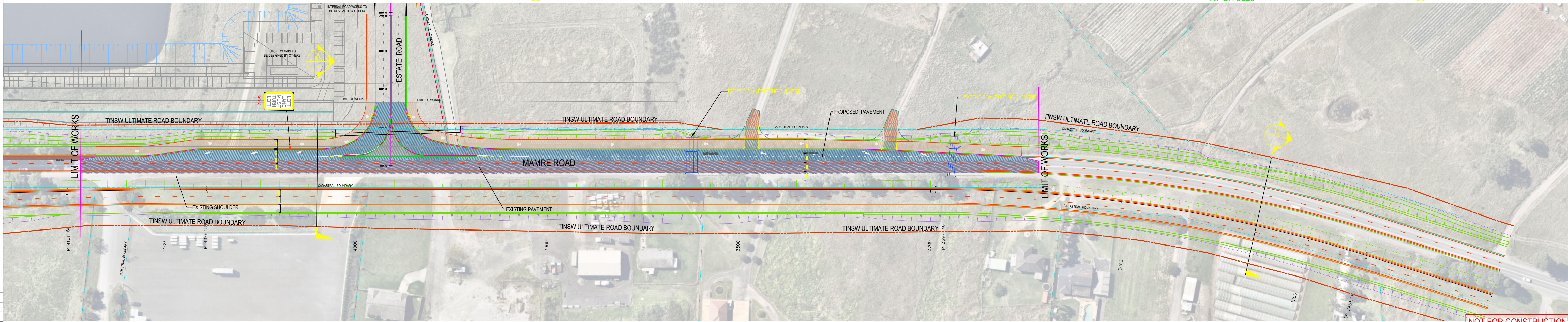
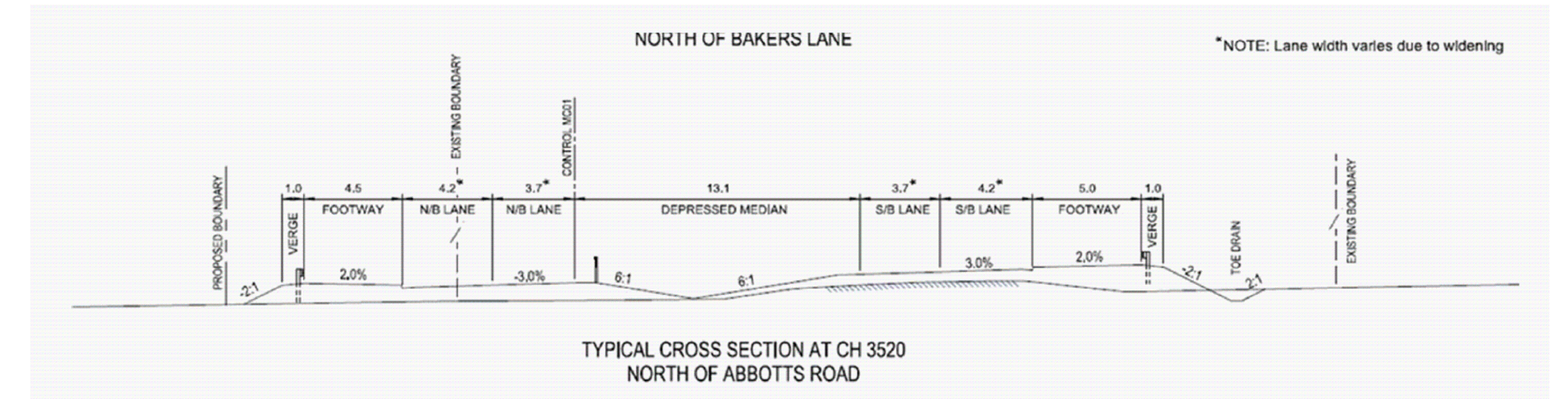
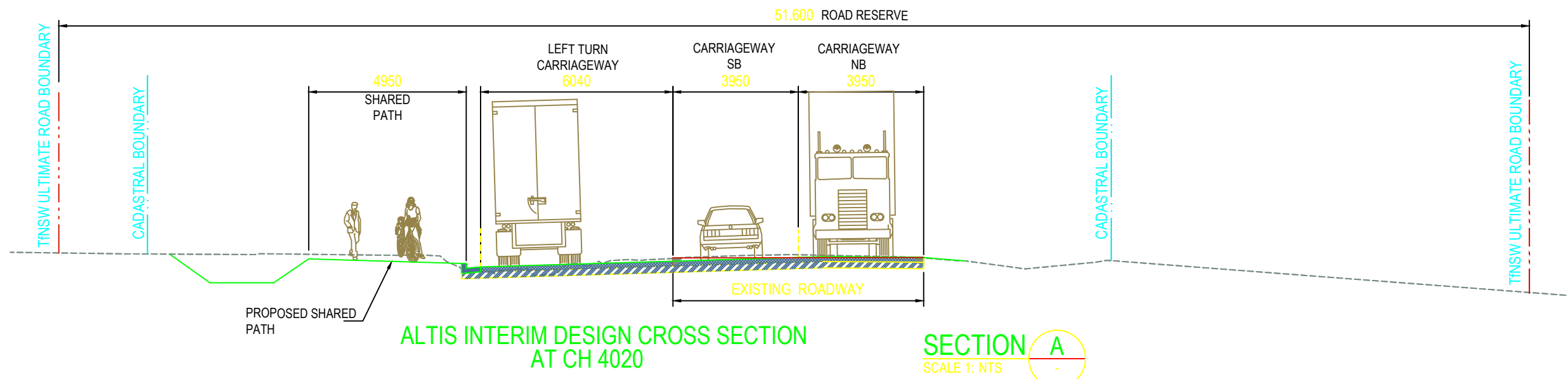
The design of direct vehicular access to developments fronting major roads should include the provision of:

- *deceleration lanes.*
- *acceleration lanes.*
- *right turn lanes.*

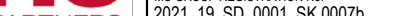
These measures should be designed in accordance with TfNSW guidelines.

This reaffirms that MU Group Strategic Design meet TfNSW standards and requirements.

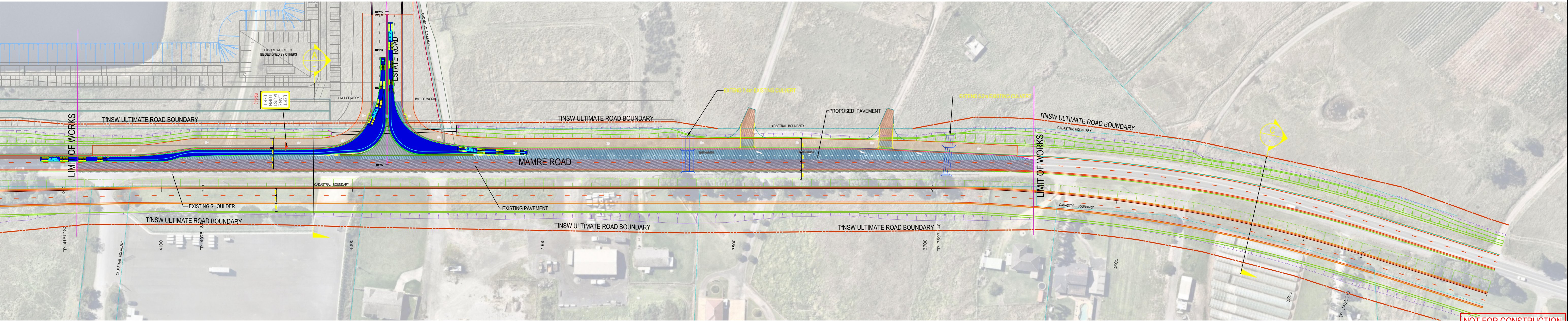
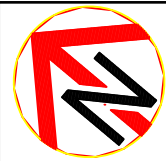
APPENDIX A – Strategic Design - LILO with acceleration lane – TfNSW Ultimate Layout



NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME S:\P\06			DATE 09/09/2022			SCALES ON A4 & SIZE DRAWING 			DRAWINGS / DESIGN PREPARED BY Level 4, 23-33 Mary Street, Surry Hills NSW 2010 T 02 8095 6418 www.mugroup.com.au			PLOT DATE / TIME 09/09/2022 14:00			PROPOSED ROADWAY M.S. M.S.			CLIENT PENRITH CITY COUNCIL AREA 884-928 MAMRE ROAD KEMPS CREEK, NSW 2759		
REV	AMENDMENT / REVISION DESCRIPTION		ISSUED BY DK	CHECKED BY DK	DATE 09/09/2022				TITLE DRAWING	NAME	DATE									
01	PRELIMINARY DRAWING FOR DISCUSSION								DWG CHECK DESIGN DESIGN CHECK DESIGN MINOR PROJECT MGR						 MUGROUP TRANSFORM AND INFRASTRUCTURE					
COORDINATE SYSTEM MGA ZONE 56						HEIGHT DATUM ASHD 2010						MU GROUP REGISTRATION NO: 2021-15 SD 0001 SKI 0007b FESSE CONTRACT STRATEGIC			SHEET 01 OF A					

APPENDIX B – Strategic Design - Swept Path of PBS Level 3 Type A Vehicle



PRELIMINARY DRAWING - FOR DISCUSSION PURPOSES ONLY



36.5m PBS Level 3 Class A

DRAWING FILE LOCATION / NAME		
P11.6.5		
REV	AMENDMENT / REVISION DESCRIPTION	DATE
01	PRELIMINARY DRAWING FOR DISCUSSION	05/09/2022

SCALES ON A4 & A3 SIZE DRAWING		
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COORDINATE SYSTEM		
MGA ZONE 56	AHD	

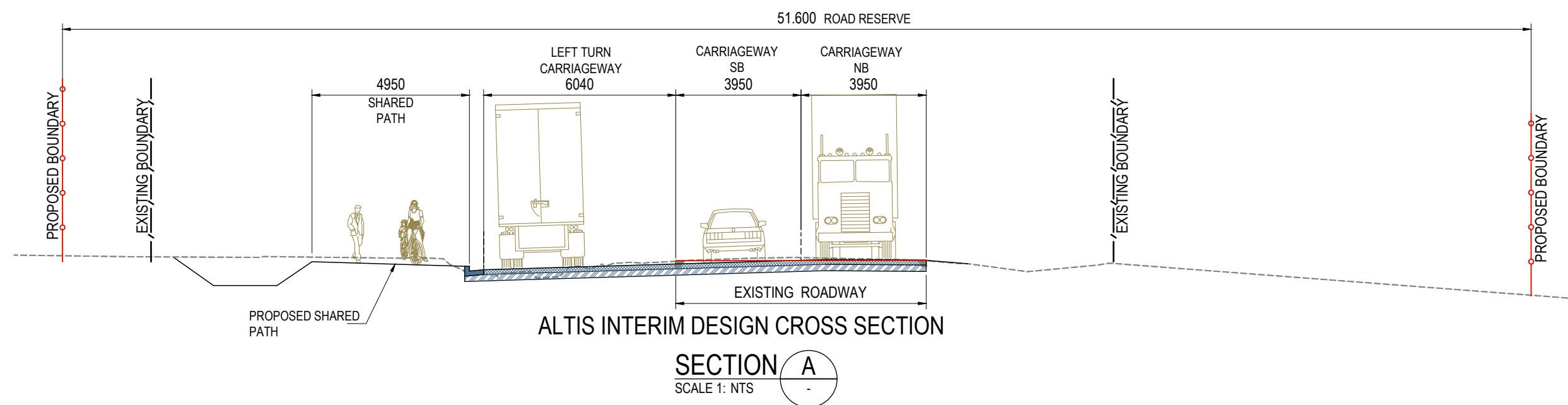
DRAWINGS / DESIGN PREPARED BY		
		
Level 4, 23-33 Mary Street, Surry Hills NSW 2010 T 02 8005 6418 www.mugroup.com.au		

PLOT DATE / TIME		
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DRG CHECK		
DESIGN		
DESIGN CHECK		
DESIGN MGR		
PROJECT MGR		

CLIENT		
		

PENRITH CITY COUNCIL AREA 884-928 MAMRE ROAD KENNERS CREEK, NSW 2759		
TNSW ULTIMATE ROAD DESIGN MAMRE ROAD		
MUGROUP REGISTRATION No. 2021-19-SD-0001-SK-0007b		
1332-0001-STRATEGIC		
	BHEET 01	ISSUE A

APPENDIX C – Strategic Design – LILO Restricting Right Turns at Mamre Road



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CO-ORDINATE SYSTEM MGA ZONE 56				HEIGHT DATUM AHD				DESIGN MINOR			
Level 4, 23-33 Mary Street, Sunny Hills NSW 2015 T 02 8085 6418 www.mugroup.com.au								PROJECT IMAGR			
DRAWINGS / DESIGN PREPARED BY				LEFT-IN LEFT-OUT FOR ALTIS ACCESS LOGISTICS PARK MATCHING TO EXISTING MAMRE ROAD				MU GROUP REGISTRATION NO: 2021_19_DS_0001_SK 0010			
SHEET 01				ALTIS PROPERTY PARTNERS				SHEET 01			

PRELIMINARY DRAWING - FOR DISCUSSION PURPOSES ONLY

APPENDIX C – Proposed Travel Path for Local Resident Vehicles

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